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CS BITS & BYTES

HIGHLIGHTING INNOVATIVE COMPUTER SCIENCE RESEARCH

Game On

Harnessing the power of games in education

ABOVE IMAGE

Screenshot from Citizen Science game which is available at: https://www.filamentgames.com/projects/citizen-science.

"Games demand both pedagogies and new software development processes."

KURT SQUIRE
UNIVERSITY OF WISCONSIN-MADISON

Video games like *Guitar Hero, Portal* and *Fold.it* are compelling examples of how technology can help millions of players develop new skills, solve complex problems, and even make scientific discoveries!

These examples show the promise of using video games for learning, however, it is not fully understood how to create effective game-based learning experiences, especially for games designed to be used in schools. To address this problem, experts in computer science, brain science, education, and social science are working together to learn how to design engaging games that foster learning.

These teams use what is known about how people learn to design games and collect data as learners are playing the games. They then use that data to help make each game better and to learn how to design games that are both fun and educational. They also can gain important fundamental knowledge about brain function, reasoning, decision-making, motivation, attention spans, confidence-building, and learning itself.

For players, video games can provide real-time and individualized feedback to maximize learning. They also enable players to explore and experiment in a virtual environment to deepen their understanding and apply what they are learning.

For example, in the game *Citizen Science*, created by University of Wisconsin professor Kurt Squire, players help a "lake spirit" restore Lake Mendota (a real lake in Wisconsin). As players explore the landscape, they take water samples; interact with a virtual, simulated watershed; and talk with stakeholders. Students collect information about the environment and use it to participate in scientific arguments that probe their thinking.

Games like Squire's *Citizen Science* are designed to help students learn subject matter content and develop critical learning skills while still having fun. Squire hopes that the knowledge and skills gained through game-based learning can be translated into real-world experiences and enable students to become active citizens in the world.

Who does this stuff?

Kurt Squire is a Professor in Digital Media in Curriculum and Instruction at the University of Wisconsin-Madison and Director of the Games+Learning+Society Theme at the Wisconsin Institute for Discovery. In his lab, scientists create games for learning based on everything they know about how people learn content and skills and about what makes games special and fun. Then, they ask students to test the games they create and make changes based on players' experiences and feedback. Squire was a co-founder of Joystick101.org, and for several years wrote a column with Henry Jenkins for *Computer Games* magazine.

TRY THIS OUT

Think you have what it takes to be a video game designer?

Discuss your answers to the following questions:

1. Why do you play video games?

2. What characteristics do the games have? Are there common characteristics that these games share? What distinguishes one from others?

3. Think of an issue you care about or a local problem (like the restoration of Lake Mendota in *Citizen Science*) you would like to solve.

4. Using the characteristics and the problem you identified above, how would you design a game that could help address this issue?

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Screenshot from Citizen Science game available at: https://www.filamentgames.com/projects/citizen-science.

Learn More

In May, leading game developers from around the world met at the 11th Annual Games for Change Festival in New York to discuss the future of the field. Check out some of what they discussed.

> http://www.gamesandlearning.org/2014/05/21/conference-offers-insights-on-key-learning-games-questions/

Want to test-drive some of the games developed by Squire and others at the Games Learning Society? Visit their site for games, lesson plans, and screenshots!

> http://www.gameslearningsociety.org/games.php

ABOUT *CS Bits & Bytes*

CS Bits & Bytes is a bi-weekly newsletter highlighting innovative computer science research. It is our hope that you will use CS Bits & Bytes to engage in the multi-faceted world of computer science to become not just a user, but also a creator of technology. Please visit our website at: www.nsf.gov/cise/csbytes.

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